

REMARKS

Claims 1 and 3-10 (as amended) and new claims 19-35 are pending. Support for the new claims is found in Figs. 3, 4, 5A-5J, and 6A-6M and the corresponding description of these Figs. noted in the specification originally filed. Additional support is found in the original claims and the abstract. Accordingly, no new matter has been introduced.

I. FIRST REJECTION OF CLAIMS 1 AND 3-8 UNDER 35 U.S.C. § 103(a) AS BEING OBVIOUS

Claims 1 and 3-10 are rejected under 35 USC § 103(a) as being obvious over U.S. Pat. No. 6,713,856 to Tsai et al. (hereinafter "Tsai") in view of U.S. Pat. No. 6,703,704 to Alcoe et al. (hereinafter "Alcoe") for the reasons noted at pages 2-5 of the Office Action. Applicants respectfully traverse this rejection for the reasons provided in detail below.

In particular, the Office Action asserts that while Tsai does not disclose a "back surface protective film" of an "epoxy resin" (as recited in amended and rejected claim 1), Alcoe does so:

Tsai et al. disclose the back surface protective film is an electrically conductive film. Tsai et al. does not disclose the back surface protective film is an epoxy resin film. However, Alcoe et al. discloses a back surface protective film (27) is an electrically conductive film or an epoxy resin film. [(Office Action at page 3, lines 8-11; emphasis added.)]

The foregoing assertions suffer from a number of deficiencies and, therefore, Applicants respectfully disagree with various aspects of those assertions as explained below.

For example, Tsai indicates (with regard to Fig. 2 thereof reproduced below) that conductive planar member 27 (of Cu) is attached to surface 14 with a conductive adhesive layer 26 (Cu paste):

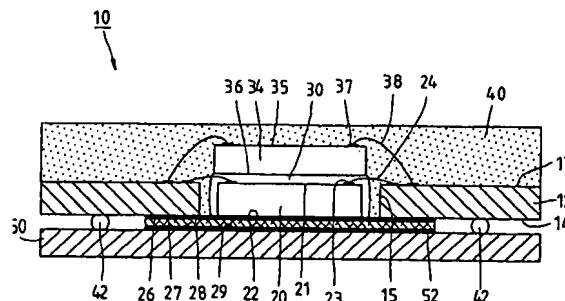


FIG. 2

The thermally and electrically **conductive** planar member 27, such as a thin copper plate, has an upper surface 28 and a lower surface 29. The planar member 27 is attached to the adhesive layer 26 with the upper surface 28 thereof. [(Tsai at col. 2, lines 48-51; emphasis added.)]

* * *

The thermally and electrically **conductive** adhesive layer 26, such as a copper paste, is disposed on the inactive side 22 of the first chip 20 and the lower surface 14 of the substrate 12 in a completely enclosing way around the through hole 15. [(Tsai at col. 2, lines 43-47; emphasis added.)]

In view of the foregoing quoted text, Tsai does not describe a back surface protective film (as recited in the rejected claims – “insulating epoxy resin”), but rather an adhesive layer 26 that is both thermally and electrically **conductive**. In fact, the Office Action acknowledges the same (in part) by the statement:

Tsai et al. disclose the back surface protective film is an electrically **conductive** film. [(Office Action at page 3, line 8; emphasis added.)]

However, in comparison, Applicants claims recite a “back surface protective film” formed by bonding an “insulating epoxy resin.” Support for an “insulating epoxy resin” is found in the specification originally filed ((The insulating layer is preferably . . . a polyimide resin and an epoxy resin, for example,”; specification at page 6, lines 21-24; emphasis added) and (. . . “a back surface protective film 31 is bonded by bonding an epoxy resin film.”; specification at page 13, lines 17-18; emphasis added)).

Accordingly the disclosure of Tsai regarding a “thermally and electrically **conductive** adhesive layer 26, such as copper paste” used to hold the “thermally and electrically **conductive** planar member 27” in place in accordance with Fig. 2 (of Tsai) **teaches away** from incorporating the “insulating epoxy resin” as recited in the rejected claims. (Emphasis added.)

In the face of Tsai **teaching away** from incorporating an “insulating epoxy resin” (as recited in the rejected claims), the Office Action (without the requisite teaching, disclosure, suggestion or motivation and in spite of the teaching away of Tsai) improperly asserts that:

Alcoe et al. discloses a back surface protective film (27) is an electrically **conductive** film or an epoxy resin. [(Office Action at page 3, lines 9-11; emphasis added.)]

Applicants respectfully submit that the foregoing assertion makes at least two errors. The first error is that the Office Action improperly ignores the above-noted **teaching away** of Tsai. The second error is that the Office Action incorrectly concludes that the “back surface protective film

(27) [of Alcoe] is an electrically conductive film” or, in the alternative, an “epoxy resin.” In fact, with regard to Fig. 2 (of Alcoe) reproduced below, numeral 27 refers to a “lid adhesive 27” and (while Alcoe refers to an “electrically conductive” and an “electrically insulative” choice for “lid adhesive 27”) the only epoxy containing example of the same (in Alcoe) is a “heat-cured silicone epoxy material” including an “aluminum filler” rendering the “lid adhesive 27” conductive rather than insulating:

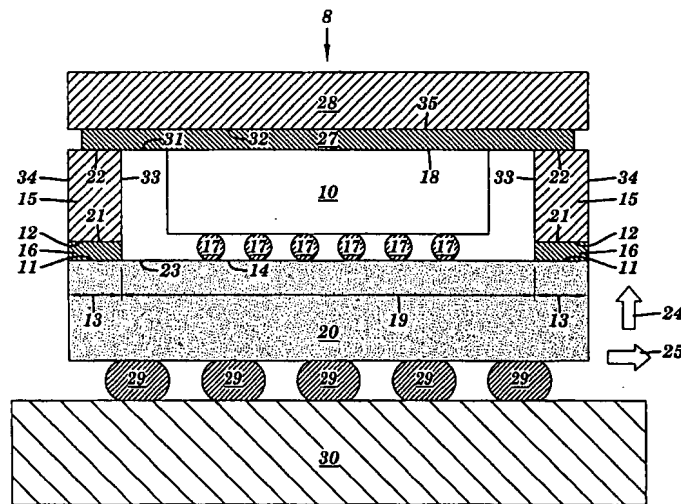


FIG. 1 (of Alcoe)

The lid adhesive 27 may be electrically conductive or electrically insulative. The lid adhesive 27 may be thermally conductive to facilitate heat dissipation. The lid adhesive 27 may comprise, inter alia, a heat-cured silicone epoxy material having a filler such as an aluminum filler. The lid adhesive 27 may have a thickness (in the direction 24) of, inter alia, 1 to 10 mils. [(Alcoe at col. 4, lines 15-22; emphasis added.)]

Thus, one of ordinary skill in the art would not be motivated to substitute the “electrically insulative” lid adhesive 27 (of Alcoe) for the “thermally and electrically conductive adhesive layer 26” (copper paste of Tsai). (Emphasis added.) Accordingly, one of ordinary skill would not have been motivated to make the above-mentioned substitution asserted in the Office Action.

Even assuming *arguendo* (without admitting the same) that “lid adhesive 27” (of Alcoe) were substituted for the “thermally and electrically conductive adhesive layer 26” (copper paste of Tsai), one of ordinary skill in the art would arguably at best only be motivated (as a hypothetical – without admitting the same) to substitute another similar “thermally and electrically conductive” candidate (of Alcoe) for the “thermally and electrically conductive adhesive layer 26” (of Tsai).

For the sake or argument (without admitting the same), the only such epoxy containing candidate may be the electrically conductive so-called “heat-cured silicone epoxy material having a filler such as an aluminum filler” (of Alcoe). In stark contrast, the “epoxy resin” recited in Applicants' rejected claims is “insulating”. No such “insulating” epoxy resin is taught, disclosed or suggested by Alcoe. (Emphasis added.) Thus, even if Tsai were combined with Alcoe, the combination would not have taught, disclosed, or suggested to one of ordinary skill in the art to arrive at the “insulating epoxy resin” in the “back surface protective film” as recited in Applicants' rejected claims. (Emphasis added.)

Furthermore, lid adhesive 27 (of Alcoe) is not situated at a back surface of a stacked body as recited in the rejected claims (*i.e.*, rejected claim 1 reciting in relevant part “said back surface protective film is bonded to a back surface of the stacked body” that is “formed by bonding two or more semiconductor devices through an insulating layer”). Also, Alcoe does not even discuss a “stacked body” of “two ore more semiconductor devices” as recited in the rejected claims. Thus, Alcoe is non-analogous art in the context of the rejected claims. As such, Applicants respectfully submit that there is no teaching, disclosure, suggestion or motivation to incorporate or to position the lid adhesive 27 (of the non-analogous art reference – *i.e.*, Alcoe) at a “back surface protective film” of a “stacked body”, as recited in the rejected claims. Likewise, there is no teaching, disclosure, suggestion or motivation to substitute the lid adhesive 27 (from a non-stacked body) into a stacked body as recited in the rejected claims. Thus, reliance on Alcoe is based on the impermissible use of hindsight reconstruction repeatedly prohibited by the Court of Appeals for the Federal Circuit.

Moreover, there is no expectation of success indicated (in Alcoe or Tsai) as to why the adhesive lid 27 (of Alcoe) would be suitable for a “back surface protective film” comprising an electrically “insulating epoxy resin” that would not interfere (or degrade) the operation of the claimed “stacked body” of “two or more semiconductor devices” recited in the rejected claims.

In view of the foregoing, Applicants respectfully submit that **(1)** Tsai teaches away from incorporating an insulating “adhesive lid 27” (of Alcoe), **(2)** Alcoe is non-analogous art with respect to the claimed invention relating to a “semiconductor package” comprising a “stacked body” of “two or more semiconductor devices” as recited in the rejected claims, **(3)** there is no motivation to combine Tsai with Alcoe as has been done, **(4)** there is no expectation of success that the so-called “epoxy material” with its “aluminum filler” (of Alcoe) will operate as the “insulating epoxy resin” in the “back surface protective film” of the “stacked body” containing “two or more semiconductor devices [bonded] through an insulating layer” as recited in the

rejected claims, (5) combining Tsai with Alcoe is achieved by the use of prohibited hindsight reconstruction – especially in the face of the teaching away and lack of expectation of success noted herein and (6) the combination of Tsai in view of Alcoe fails to arrive at Applicants' claimed invention.

Applicants note that the above-noted deficiencies of Tsai in view of Alcoe applied to rejected claim 1 also apply equally to claims 3-10 ultimately depending from base claim 1.

Accordingly, Applicants respectfully submit that claims 1 and 3-10 are unobvious and patentable over Tsai in view of Alcoe. As such, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1 and 3-10 as being obvious under 35 USC § 103(a) over Tsai in view of Alcoe.

II. SECOND REJECTION OF CLAIMS 1 AND 3-10 UNDER 35 U.S.C. § 103(a)

Claims 1 and 3-10 are rejected under 35 USC § 103(a) as being unpatentable over U.S. Pat. No. 5,627,106 to Hsu (hereinafter "Hsu") in view of Alcoe for the reasons noted at pages 5-8 of the Office Action. Applicants respectfully traverse the instant rejection for the reasons noted below.

In particular, the Office Action refers to Fig. 12 of Hsu reproduced below:

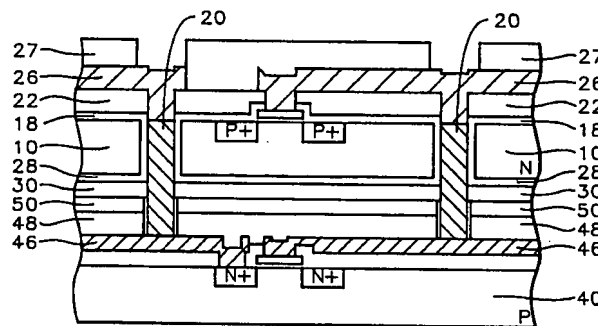


FIG. 12

With reference to Fig. 12 (of Hsu), the Office Action asserts that:

Hsu does not disclose the semiconductor device (40) positioned, in sequence as lowermost semiconductor device further comprises a back surface protective film and a heat radiation layer of a material having a high heat transfer rate, on the non-device pattern surface of the lowermost semiconductor device, wherein the [back] surface protective film is an epoxy resin film. [(Office Action at page 5, lines 14-17; emphasis added.)]

With reference to the above-quoted assertion, Applicants agree that Hsu does not specify which of the chips on 10 or 40 (of Fig. 12 of Hsu) is the uppermost and which is the lowermost. In fact, Hsu refers to one or more chips on 10 (subordinate chips) that may be formed on a chip on 40 (master chip) without identifying which chip is the lowermost and which chip is the uppermost – as noted in relevant part below:

Referring now to FIG. 12, a metal layer 26 is deposited on the surface of the subordinate chip and patterned. A silicon dioxide layer 27 is deposited over the metal layer 26. The top surface of the subordinate chip [i.e., chip formed on substrate 10 – see Fig. 8 of Hsu] can now be prepared to be connected to other subordinate chips. This combination chip [i.e., the combination of the master chip 40 and subordinate chip 10] will now act as the master chip to be connected to another subordinate chip, following the process of the invention described in detail above. [Hsu at col. 4, lines 7-14; emphasis added.]]

Thus, it is clear that Hsu does not specify which of the master chip 40, the subordinate chip 10 or their combination is uppermost or lowermost.

However, there is no disclosure, teaching, suggestion or motivation within Hsu to include a “heat radiation layer” and/or a “back surface protective film” as recited in the rejected claims. Also, there is no disclosure, teaching, suggestion or motivation within Hsu as to where to position such an undisclosed “heat radiation layer” and/or a “back surface protective film” (as recited in the rejected claims) within the device of Fig. 12 (of Hsu).

Nevertheless, even without the requisite disclosure, teaching, suggestion or motivation to include and/or to position either a “heat radiation layer” and/or a “back surface protective film” (as recited in the rejected claims) within the device of Fig. 12 (of Hsu), the Office Action improperly asserts that:

However, Alcoe et al. discloses a semiconductor device [that] comprises a back surface protective film (27) and a heat radiation layer (28) of a material having a high heat transfer rate, on the non[-]device pattern surface of the lowermost semiconductor device, wherein the back surface protective film is an epoxy resin film. [(Office Action at page 5, lines 18-21; emphasis added.))]

However, as noted, there is no motivation to rely on Alcoe either within Alcoe or within Hsu. Thus, combining Alcoe with Hsu is done so without the requisite motivation and with the use of prohibited hindsight reconstruction. For brevity, Applicants respectfully incorporate herein by reference their above-noted remarks regarding the deficiencies of Alcoe without having to

repeat the same and apply those remarks to the instant rejection under 35 USC § 103(a) over Hsu in view of Alcoe.

In effect, Applicants respectfully submit that (1) Hsu does not provide the requisite disclosure, teaching, suggestion or motivation to incorporate or where to position an insulating “adhesive lid 27” (of Alcoe), (2) Alcoe is non-analogous art with respect to the claimed invention relating to a “semiconductor package” comprising a “stacked body” of “two or more semiconductor devices” as recited in the rejected claims, (3) there is no motivation to combine Hsu with Alcoe as has been done, (4) combining Hsu with Alcoe is achieved by the use of prohibited hindsight reconstruction – especially as Hsu does not even discuss incorporation of the “insulating epoxy resin” of the “back side protective film” as recited in the rejected claims, (5) there is no expectation of success that the so-called “epoxy material” with its “aluminum filler” (of Alcoe) will operate as the “insulating epoxy resin” in the “back surface protective film” of the “stacked body” containing “two or more semiconductor devices [bonded] through an insulating layer” as recited in the rejected claims, and (6) the combination of Hsu in view of Alcoe fails to arrive at Applicants’ claimed invention.

Applicants note that the above-noted deficiencies of Hsu in view of Alcoe applied to rejected claim 1 also apply equally to claims 3-10 ultimately depending from base claim 1.

Accordingly, Applicants respectfully submit that claims 1 and 3-10 are unobvious and patentable over Hsu in view of Alcoe. As such, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1 and 3-10 as being obvious under 35 USC § 103(a) over Hsu in view of Alcoe.

III. NEW CLAIMS

New claims 19-35 are added to avoid “product-by-process” claim language. The claims are fully supported by the specification originally filed. As such, no new matter has been introduced.

The new claims are patentable over the references of record.

CONCLUSION

If there are any formal matters remaining after this response, the Examiner is respectfully requested to telephone the undersigned to attend to these matters.

A check for the excess claims fee for seven additional claims (\$300) and a one-month extension of time fee (\$120) is enclosed herewith.

No additional fees are believed to be due. However, if an underpayment or overpayment of fees has been made associated with filing of this Amendment, please debit or credit our Deposit Account No. 19-3935, as needed.

Respectfully submitted,

STAAS & HALSEY LLP

Date: May 15, 2007

By: Ajay Pathak
Ajay Pathak
Registration No. 38,266

1201 New York Ave, N.W., 7th Floor
Washington, D.C. 20005

Direct: (202) 454-1594
Telephone: (202) 434-1500 (Main)
Facsimile: (202) 434-1501

Enclosure:
Check (\$420)